

WHAT IS CLAIMED IS:

1. A projection screen for displaying an image from an image source, the screen comprising:
a first diffusing assembly including a pre-screen comprising at least one optical faceplate
5 of fibrous crystal; and

a second diffusing assembly comprising a diffused rear projection screen, the faceplate
being positioned to receive an image from the image source and to further diffuse said image.

10 2. The screen of claim 1 wherein the pre-screen comprises a plurality of seamlessly tiled
optical faceplates of fibrous crystal.

15 3. The screen of claim 1 further including an anti-reflection coating on a viewing side of
said projection screen.

4. The screen of claim 1 wherein the optical faceplate is made from fibrous crystals selected
from the group consisting of crystals not found in nature, and crystals not found in nature in
fibrous form.

20 5. The screen of claim 1 wherein the optical faceplate is made from crystals selected from
the group consisting of artificially grown crystals and synthesized crystals which do not exist in
nature.

25 6. The screen of claim 1 wherein the optical faceplate is made from a material having
fibrous crystals which are transparent, colorless, work as a coherent faceplate, and comprise
fibers having a numeric aperture of between about 0.2 - 0.66.

7. The screen of claim 6 wherein the material is selected from the group consisting of
Ulexite, Selenite, Artinite and Aragonite.

8. The screen of claim 6 wherein the optical faceplate is made of lab-grown Ulexite (NaCaB₅O₉ 8H₂O).

9. An optical faceplate comprising lab-grown crystal.

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10. The optical faceplate of claim 9 made from at least one crystal selected from the group consisting of artificially grown crystals and synthesized fibrous crystals which do not exist in nature.

10 11. The optical faceplate of claim 9 made of a plurality of sheets of lab-grown crystal.

12. The optical faceplate of claim 9 made of at least one sheet of lab-grown Ulexite (NaCaB₅O₉ 8H₂O) crystal.

15 13. The optical faceplate of claim 9 made of at least one sheet of Quartz crystal.

14. The optical faceplate of claim 9 wherein the crystal has a regular fibrous structure, and grows as a bundle of aligned fibers.

20 15. The optical faceplate of claim wherein 14 the shape of a fiber cross section is not round.

16. The optical faceplate of claim 14 wherein the crystal is colorless, possesses a high transparency in the long dimension of a fiber of the bundle of fibers, inter-scatter between fibers is low, and the fibers align strictly in parallel.

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17. The optical faceplate of claim 14 wherein the numerical aperture of a single fiber is within a range of about 0.20 - 0.66.

18. The optical faceplate of claim 17 wherein the numerical aperture of a single fiber is within a range of about 0.24 to 0.35.

5 19. The optical faceplate of claim 9 wherein the crystal is environmentally stable and capable of existing in a stable form at a temperature range from about -20 to +70 degrees C.

10 20. The optical faceplate of claim 9 wherein the crystal is non-toxic.

15 21. The optical faceplate of claim 9 wherein the optical faceplate is made from a material having fibrous crystals which are transparent, colorless, work as a coherent faceplate, and comprise fibers having a numeric aperture of between about 0.2 - 0.66.

20 22. The optical faceplate of claim 21 wherein the material is selected from the group consisting of Ulexite, Selenite, Artinite and Aragonite.

25 23. The optical faceplate of claim 21 wherein the material comprises lab-grown Ulexite ($\text{NaCaB}_5\text{O}_9\text{8H}_2\text{O}$).

24. The optical faceplate of claim 23 wherein the material further comprises a dopant.

25 26. The optical faceplate of claim 23 wherein the Ulexite is grown by a hydrothermal method.

27. The optical faceplate of claim 23 wherein the Ulexite is lab-grown by recrystallizing natural Ulexite.

28. The optical faceplate of claim 21 wherein the material is Quartz.

29. The optical faceplate of claim 21 wherein the material further comprises a dopant.

5 30. The optical faceplate of claim 28 wherein the Quartz is grown by a hydrothermal method.

31. An optical faceplate of fibrous crystal for a device selected from the group consisting of image intensifiers, field flatteners, liquid crystal light valves (LCLVs), CCD arrays, X-ray imaging devices, CRT displays, and remote viewers.